

In the claims:

Claim 1. (Currently amended) A method of obtaining a photosynthetic plant characterized by enhanced inorganic carbon fixation, the method comprising:

- (a) transforming cells of photosynthetic plants with a nucleic acid construct which comprises including:
 - (i) a polynucleotide encoding a polypeptide having a bicarbonate transporter activity, wherein said polypeptide is at least 95% homologous to SEQ ID NO: 3, as determined using Blast software where gap open penalty equals 11, gap extension penalty equals 1 and matrix is blosum 62~~capable of hybridizing under high stringency conditions to the nucleic acid of SEQ ID NO: 2, wherein said polynucleotide encodes a polypeptide having an inorganic carbon fixation activity; and~~
 - (ii) a plant promoter operable in directing nuclear transcription of said polynucleotide; and
- (b) selecting from said photosynthetic plants of step (a) a photosynthetic plant comprising cells having at least 5% enhanced inorganic carbon fixation as compared to otherwise similar, non-transformed cells of said photosynthetic plants;

thereby obtaining the photosynthetic plant characterized by enhanced inorganic carbon fixation.

Claim 2. (Previously amended) The method of claim 1, wherein said transforming said cells of the photosynthetic plant with said nucleic acid construct is effected by a method selected from the group consisting of genetic transformation and transient transformation.

Claim 3. (Currently amended) The method of claim 2, wherein said genetic transformation is effected by a method selected from the group consisting of Agrobacterium mediated transformation, electroporation and particle bombardment.

Claim 4. (Original) The method of claim 2, wherein said transient

transformation is effected by a method selected from the group consisting of viral transformation, electroporation and particle bombardment.

Claim 5. (Cancelled).

Claim 6. (Cancelled)

Claim 7. (Cancelled)

Claim 8. (Previously amended) The method of claim 1, wherein said photosynthetic plant is a C3 plant.

Claim 9. (Previously amended) The method of claim 8, wherein said C3 plant is selected from the group consisting of tobacco, tomato, soybean, potato, cucumber, cotton, wheat, rice and barley.

Claim 10. (Previously amended) The method of claim 1, wherein said photosynthetic plant is a C4 plant.

Claim 11. (Original) The method of claim 10, wherein said C4 plant is selected from the group consisting of corn, sugar cane and sorghum.

Claim 12. (Cancelled)

Claim 13. (Previously amended) The method of claim 1, wherein said plant promoter is selected from the group consisting of a constitutive plant promoter, a tissue specific plant promoter and an inducible plant promoter.

Claim 14. (Currently amended) The method of claim 13, wherein:

- (i) said constitutive plant promoter is ~~independently~~ selected from the group consisting of CaMV35S plant promoter, CaMV19S plant promoter, FMV34S plant promoter, sugarcane

bacilliform badnavirus plant promoter, CsVMV plant promoter, *Arabidopsis* ACT2/ACT8 actin plant promoter, *Arabidopsis* ubiquitin UBQ1 plant promoter, barley leaf thionin BTH6 plant promoter, and rice actin plant promoter;

- (ii) said tissue specific plant promoter is ~~independently~~-selected from the group consisting of bean phaseolin storage protein plant promoter, DLEC plant promoter, PHS β plant promoter, zein storage protein plant promoter, conglutin gamma plant promoter from soybean, AT2S1 gene plant promoter, ACT11 actin plant promoter from *Arabidopsis*, napA plant promoter from *Brassica napus* and potato patatin gene plant promoter; and
- (iii) said inducible plant promoter is ~~independently~~-selected from the group consisting of a light-inducible plant promoter derived from the pea rbcS gene, a plant promoter from the alfalfa rbcS gene, DRE, MYC and MYB plant promoters which are active in drought; INT, INPS, prxEa, Ha hsp17.7G4 and RD21 plant promoters active in high salinity and osmotic stress, and hsr203J and str246C plant promoters active in pathogenic stress.

Claim15. (Currently amended) The method of claim 1, wherein said polynucleotide further ~~comprises~~includes a sequence element selected from the group consisting of a nucleic acid sequence encoding a transit peptide, an origin of replication for propagation in bacterial cells, at least one sequence element for ~~integration~~ into a plant's genome, a polyadenylation recognition sequence, a transcription termination signal, a sequence encoding a translation start site, a sequence encoding a translation stop site, plant RNA virus-~~derived~~ sequences, plant DNA virus-~~derived~~ sequences, tumor inducing (Ti) plasmid-~~derived~~ sequences and a transposable element-~~derived~~ sequence.

Claim 16. (Currently amended) A nucleic acid construct for enhancing carbon fixation by a photosynthetic plant, the nucleic acid construct comprising:

- (a) a polynucleotide encoding a polypeptide having a bicarbonate transporter activity, wherein said polypeptide is at least 95% homologous to SEQ ID NO: 3, as determined using Blast software where gap open penalty equals 11, gap extension penalty equals 1 and matrix is blosum 62~~capable of hybridizing under high stringency conditions to the nucleic acid of SEQ ID NO: 2, wherein said polynucleotide encodes a polypeptide having enhanced inorganic carbon fixation activity; and~~
- (b) a plant promoter capable of~~being for~~ directing transcription of said polynucleotide

wherein expression of said polypeptide in cells of the photosynthetic plant results in at least 5% enhanced inorganic carbon fixation as measured in comparison to otherwise similar, non-transformed cells of the photosynthetic plant.

Claim 17. (Cancelled)

Claim 18. (Cancelled)

Claim 19. (Cancelled)

Claim 20. (Currently amended) The nucleic acid construct of claim 16, wherein said plant promoter is selected from the group consisting of a constitutive plant promoter, a tissue specific plant promoter and an inducible plant promoter.

Claim 21. (Currently amended) The nucleic acid molecule of claim 20, wherein:

- (i) said constitutive plant promoter is ~~independently~~ selected from the group consisting of CaMV35S plant promoter, CaMV19S plant promoter, FMV34S plant promoter, sugarcane bacilliform badnavirus plant promoter, CsVMV plant promoter,

Arabidopsis ACT2/ACT8 actin plant promoter, *Arabidopsis* ubiquitin UBQ1 plant promoter, barley leaf thionin BTH6 plant promoter, and rice actin plant promoter;

- (ii) said tissue specific plant promoter is ~~independently~~-selected from the group consisting of bean phaseolin storage protein plant promoter, DLEC plant promoter, PHS β plant promoter, zein storage protein plant promoter, conglutin gamma plant promoter from soybean, AT2S1 gene plant promoter, ACT11 actin plant promoter from *Arabidopsis*, napA plant promoter from *Brassica napus* and potato patatin gene plant promoter; and
- (iii) said inducible plant promoter is ~~independently~~-selected from the group consisting of a light-inducible plant promoter derived from the pea rbcS gene, a plant promoter from the alfalfa rbcS gene, DRE, MYC and MYB plant promoters which are active in drought; INT, INPS, prxEa, Ha hsp17.7G4 and RD21 plant promoters active in high salinity and osmotic stress, and hsr203J and str246C plant promoters active in pathogenic stress.

Claim 22. (Currently amended) The nucleic acid construct of claim 16, further comprising a sequence element selected from the group consisting of an origin of replication for propagation in bacterial cells, at least one sequence element for integration into a plant's genome, a polyadenylation recognition sequence, a transcription termination signal, a sequence encoding a translation start site, a sequence encoding a translation stop site, plant RNA virus-~~derived~~ sequences, plant DNA virus ~~derived~~ sequences, tumor inducing (Ti) plasmid-~~derived~~ sequences and a transposable element-~~derived~~ sequence.

Claim 23. (Previously amended) A transformed photosynthetic plant comprising the nucleic acid construct of claim 16.

Claim 24. (Cancelled)

Claim 25. (Cancelled)

Claim 26. (Previously amended) The transformed photosynthetic plant of claim 23, wherein said plant is a C3 plant.

Claim 27. (Previously amended) The transformed photosynthetic plant of claim 26, wherein said C3 plant is selected from the group consisting of tobacco, tomato, soybean, potato, cucumber, cotton, wheat, rice and barley.

Claim 28. (Previously amended) The transformed photosynthetic plant of claim 23, wherein said plant is a C4 plant.

Claim 29. (Previously amended) The transformed photosynthetic plant of claim 28, wherein said C4 plant is selected from the group consisting of corn, sugar cane and sorghum.

Claim 30. (Previously amended) The transformed photosynthetic plant of claim 23, wherein said plant is characterized by a photosynthetic rate at least 10 % higher as compared to a control non-transformed organism under otherwise identical conditions.